REMARKS

Claims 55 and 56 are pending in this application.

Claims 55 and 56 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Soininen et al. (U.S. Patent No. 6,482,740) ("Soininen"). This rejection is respectfully traversed.

The claimed invention relates to a capacitor comprising a rhodium layer formed by atomic layer deposition. As such, independent claim 55 recites a "capacitor" comprising "a first electrode and a second electrode," "a dielectric provided between said first electrode and said second electrode" and "at least one of said first and second electrode comprising a continuous ALD deposited rhodium film with reduced carbon content." Independent claim 56 recites a "capacitor" comprising "a first electrode and a second electrode," "a dielectric provided between said first electrode and said second electrode" and "at least one of said first and second electrode comprising a reduced-carbon rhodium film formed by rhodium atomic layer deposition at a temperature of about 100°C to about 200°C."

Soininen relates to a method of forming conductive layers suitable for use in an integrated circuit. Soininen teaches that "a metal oxide thin film is deposited on a substrate surface and reduced thereafter essentially into a metallic form with an organic reducing agent." (Abstract). According to Soininen, a "metal oxide thin film is grown on the diffusion barrier 14 from alternate pulses of a metal source chemical and oxygen source chemical." (Col. 7, lines 26-29). Soininen recites that the "pulsing cycle is repeated until the thickness of the metal oxide film is sufficient for seed layer purposes" and then the "metal oxide film is reduced into a metal layer." (Col. 7, lines 33-36).

The subject matter of claims 55 and 56 would not have been obvious over Soininen. Specifically, the Office Action fails to establish a *prima facie* case of

obviousness. To establish a *prima facie* case of obviousness, three requirements must be met: (1) some suggestion or motivation, either in the references themselves or in the knowledge of a person of ordinary skill in the art, to modify the reference or combine reference teachings; (2) a reasonable expectation of success; and (3) the prior art reference (or references when combined) must teach or suggest all the claim limitations. More importantly, the teaching or suggestion to make the claimed combination and the reasonable expectation for success must both be found in the prior art and not based on Applicant's disclosure. See, e.g., In re Royka, 490 F.2d 981 (CCPA 1974).

In the present case, Soininen fails to teach or suggest all limitations of independent claims 55 and 55. Soininen does not teach or suggest first and second capacitor electrodes, "at least one of said first and second electrode comprising a continuous ALD deposited rhodium film with reduced carbon content," as independent claim 55 recites. Soininen teaches a metal oxide layer formed by ALD, and not an "ALD deposited rhodium film," much less an "ALD deposited rhodium film with reduced carbon content," as in the claimed invention.

Soininen also fails to teach or suggest that at least one of the first and second electrodes comprises "a reduced-carbon rhodium film formed by rhodium atomic layer deposition at a temperature of about 100°C to about 200°C," as independent claim 56 recites. In Soininen, the metal film formed at the end of its dual-step process is not "a reduced-carbon rhodium film," much less "a reduced-carbon rhodium film formed by rhodium atomic layer deposition at a temperature of about 100°C to about 200°C," as in the claimed invention. As noted, Soininen teaches first the formation of a metal oxide film and then subjecting the metal oxide film to an organic reducing agent. Thus, Soininen is silent about an "ALD deposited rhodium film," or "a reduced-carbon rhodium film formed by rhodium atomic layer deposition," or "a reduced-carbon

rhodium film formed by rhodium atomic layer deposition at a temperature of about 100°C to about 200°C," as in the claimed invention.

Applicants also note that the limitation "a continuous ALD deposited rhodium film" is not a product-by-process limitation, as the last Office Action asserts, but rather a *resulting structure* having distinct and defined characteristics. Applicants submit that courts have unanimously recognized that "where it is not possible to define the characteristics which make it (an article) inventive except by referring to the process by which the article is made, he (the Applicant) is permitted to so claim his article, but is limited in his protection to articles produced by his method referred to in the claims." In re Moeller, 117 F.2d 565, 568 (CCPA 1941).

For example, in R2 Medical Systems, Inc. v. Katecho, Inc., which involved a claim reciting that one element be "affixed" to another, the court found that "'affixed' means 'to be attached physically.'" R2 Medical Systems, Inc. v. Katecho, Inc., 931 F.Supp. 1397, 1425-26 (N.D. Ill. 1996). The Court held that "[T]he terms of the claims do not indicate that 'affixed' refers to a process by which the stannous chloride is bound to the conductive plate, but only that it refers to the result of that process." Id. (quoting CVI/Beta Ventures, Inc. v. Custom Optical Frames, Inc., 893 F. Supp. 508, 519 (D. Md. 1995) (limitation that element be in 'work-hardened pseudoelastic metallurgic state' is directed to the structure, not the process, of manufacture)).

In Hazani v. U.S. Int'l Trade Comm'n, which involved patent claims to a memory cell comprising a conductive plate having a surface that was "chemically engraved," the Federal Circuit also held that the claims were "pure product claims" and not product-by-process claims. Hazani v. U.S. Int'l Trade Comm'n, 126 F.3d 1473 (Fed. Cir. 1997). The Federal Circuit reasoned that the "chemically engraved" limitation, read in context, described the product more by its structure rather than by

the process used to obtain it. Id.

In the present case, claim 55 recites the limitation "continuous ALD deposited rhodium film" which is a structural limitation and not a product-by-process limitation. A "continuous ALD deposited rhodium film" is a *resulting structure* having distinct and defined characteristics, for example, a particular thickness and composition, such as a reduced carbon content. Thus, in view of R2 Medical Systems and Hazani, the limitation "a continuous ALD deposited rhodium film" is not a product formed by a particular process.

The product of Soininen is not formed by "the same process described in [the] claim [55]." The capacitor electrode of Soininen is formed by a dual-step process according to which a metal oxide film is first formed and then subjected to a reduction reaction to remove oxygen from the metal oxide film. In contrast, the capacitor electrode of the claimed invention is formed by first providing an ALD deposited rhodium film and then subjecting the ALD deposited rhodium film to an oxygen environment to remove carbon. In addition, the ALD deposited rhodium film of the claimed invention is formed at a very low temperature, i.e., "at a temperature of about 100°C to about 200°C" (claim 56), which is not taught or suggested by Soininen. Thus, the process of Soininen is completely different from that of the claimed invention. For at least these reasons, the subject matter of claims 55 and 56 would not have been obvious over Soininen, and withdrawal of the rejection of these claims is respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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